

U.S. Rural electrification administration Applications
and loans division.

Cat
ADEO
Add

1.933
Su76

SURVEY AND REPORT
OF
PRESENT AND FUTURE LOAD REQUIREMENTS
OF
RURAL ELECTRIC COOPERATIVE

KOOTENAI RURAL ELECTRIFICATION ASSOCIATION, INC.
(IDAHO II KOOTENAI)
COEUR d' ALENE, IDAHO

APPLICATIONS AND LOANS DIVISION
RURAL ELECTRIFICATION ADMINISTRATION
WASHINGTON, D. C.
MAY 1946

MAY 11 1948

	Page No.
Purpose of Report	3
Summary & Conclusions	5
Method of Survey & Sources of Information	7
Description of the Area	9
Economy of the Area	11
Sources of Supply	15
Other Utilities	16
Rates	21
Types of Loads to be Served	27
Farms	27
Non-Farm	30
Seasonal Cottages	30
Commercial	34
Irrigation	35
Lumbering	37
Frozen Food Processing	39
Fruit Canning Plants	40
Potato Grading & Storage Plants	40
Grain Elevators	40
Mining	41
Radio & Communication Towers	41
Airway Beacons	42
Peat Moss Processing	42
Acquisitions	44
Estimate of Loads	46
Estimated Ultimate System Investment	48
Table I	50
Table II	51
Table III	52

Drawing No. 1

SURVEY AND REPORT
OF
PRESENT AND FUTURE LOAD REQUIREMENTS
OF
RURAL ELECTRIC COOPERATIVES 1/

PURPOSE OF REPORT

The purpose of this report is to investigate and tabulate, insofar as possible at this time, the existing electric loads now served by the Kootenai Rural Electrification Association, Inc., together with the prospective electrical loads which may reasonably be expected to develop and be served by this cooperative during the next two, five and ten years.

The immediate purpose of the report is to establish present and probable future power requirements of the cooperative and resulting load data for consideration by the Bonneville Power Administration in its studies of the feasibility of extending transmission lines into the area to provide adequate low cost power to the present and future members of the cooperative as well as to other loads independent of this study.

This report does not purport to establish the feasibility of the cooperative serving all loads tabulated in the survey nor does it intend to show by inference that funds are or will be earmarked by the Rural Electrification Administration for service to such loads. Each application for REA loan funds will, as in the past, be considered on its own merits.

Other purposes of the report are:

- (1) To provide a foundation upon which to base a long range rate structure,
- (2) To furnish pertinent information in connection with a future system study to be prepared by the cooperative,

1/ Prepared by William G. Mills, Applications and Loans Division, REA
USDA.

MAY 17 1948

- (3) To serve as a guide for a power use program, and
- (4) To arrive at the ultimate investment which the cooperative will be obliged to make in order to provide central station service to all of the anticipated loads.

Consideration has been given to present rural industrial loads which are not now served by central station power and to those which may be expected to be served as the result of the further development of the natural resources of the area.

The attached key map shows:

- (1) Tentative cooperative boundaries;
- (2) Existing and proposed cooperative lines;
- (3) Probable area of development;
- (4) Location of existing power loads requiring three-phase power; and
- (5) Estimated kilowatt demands and kilowatt hour consumption at each of the tentative points of delivery for Bonneville power.

SUMMARY AND CONCLUSIONS

The survey reveals that a substantial potential market for electrical energy exists in the area served by the subject cooperative.

Table III of the load estimates indicates that there will be a total maximum demand of approximately 1275 kilowatts in 1948, 2600 kilowatts in 1951 and 4750 kilowatts in 1956. It is likewise estimated that there will be a total annual energy requirement of approximately 4,666,000 kilowatt hours in 1948, 9,780,000 kilowatt hours in 1951 and 17,085,000 kilowatt hours in 1956. These estimates indicate that the load factor will be approximately 44.7 percent in 1948, 43 percent in 1951 and 41.1 percent in 1956. This rather low load factor is a direct result of the increase in the proportion of rural industrial loads to be served in relation to the farm loads.

It is further estimated that approximately one-fourth of the ultimate development will occur on the Harrison Section of the cooperative's system and will, therefore, require a separate source of supply adequate to serve the anticipated power requirements.

It is estimated that the cooperative will be serving a total of approximately 1,385 members in 1948, 1,835 members in 1951 and 2,275 members in 1956, exclusive of Farragut Village, irrigation pumps acquisitions and rural industrial consumers. Inasmuch as negotiations have not yet been completed for converting it to a "GI" college it is assumed, to permit bringing this report to conclusion, that the Farragut Naval Training Station will be closed and that those consumers served in the past and now being served as a result of its operation will no longer be served.

The study indicates that a total of 850 miles of line will be required to serve all of the consumers included in Tables I and II, requiring an investment on the part of the cooperative of approximately \$1,130,000.

Under the present wheeling arrangements effected as an emergency measure during the war, Bonneville power is being furnished the cooperative through facilities of the Washington Water Power Company at a cost to the cooperative of approximately 3.5 mills per KWH. This arrangement will remain in force for 18 months following the official declaration of the end of the war, at which time the cooperative may be forced to revert to a higher rate from its former power supplier. The failure to provide an adequate supply of low cost power will seriously hamper the potential economic and industrial development of the area and will deprive many rural residents of the benefits of low cost power.

It is recommended that the results of this survey be made available to the Bonneville Power Administration for its consideration in the determination of the feasibility of making Bonneville power available to the cooperative over government owned facilities before the expiration of the present wheeling arrangements with the Washington Water and Power Company.

It is urged that an intensive power use program be initiated by the cooperative, assisted by the Rural Electrification Administration, in order to hasten the achievement of the estimated kilowatt hour consumption foreseen in this report.

METHOD OF SURVEY AND SOURCES OF INFORMATION

A survey and report similar to the subject report has been completed on the Northern Idaho Rural Electrical Rehabilitation Association (Idaho 4 Bonner), an REA cooperative located adjacent to this cooperative. One of the factors used in determining the estimated future KWH consumption in the above study was that obtained from results of a mail questionnaire circulated to each member of the cooperative, in which the members were asked to indicate their intentions regarding the purchase and use of appliances in the immediate future. As of the date of this report, no such questionnaire has been circulated on the subject cooperative; however, because of the close proximity and similarity of the two cooperative areas, it is believed that a mail questionnaire, if one had been circulated, would have produced approximately similar results on this cooperative.

However, a detailed inspection of the entire area was made in the field. Municipal utilities at Plummer, Worley and Harrison were visited in order to secure pertinent operating statistics. Operating records of the Kootenai Rural Electrification Association were examined and analyzed to secure information as to load densities on individual sections of the system and operating experience.

Additional information was secured from local officials of the County Extension Service, Soil Conservation Service, U. S. Forest Service, and the cooperative manager and local real estate agents.

Potential development of natural resources and energy consuming farm equipment was discussed with representatives of the Bonneville Power Administration in Spokane, Washington, and with industrial farm equipment sales representatives operating in the area.

In determining the estimated average consumption per consumer, consideration was given to the experience of operating systems in areas of similar economic and productive characteristics; the application of electric power to productive use determined by the prevailing type of farming and other related enterprises existing in the area; effect of electric service toward stimulation of new enterprises, and other economic activities in the community; the general progressiveness of the farm people and their willingness to adopt new methods and technique with the use of electricity in farming operations; and the influence of low wholesale power rates.

Since time and available personnel did not permit a more detailed survey than has been made, the load estimates represent a judgment arrived at through experience and competent understanding of the factors affecting the future use of electricity in rural areas.

DESCRIPTION OF THE AREA

The area is comprised of all of Kootenai and Shoshone Counties and the northern strip of Benewah County, and is located in the panhandle of Idaho. It is mountainous and heavily covered with growths of white pine, ponderosa pine, red cedar, larch and fir. The area is part of the Columbia River drainage basin. The Coeur d'Alene and the St. Joe Rivers discharge into Coeur d'Alene Lake, which in turn provides the source of the Spokane River. Waters from the Spokane River flow westward from Coeur d'Alene through Spokane County in Washington and discharge into the Columbia River reservoir near old Fort Spokane in Lincoln County. Most of the potential hydroelectric generating capacity of this river has been developed by the Washington Water Power Company.

The western part of the area is dotted by numerous lakes, the largest of which is Coeur d'Alene Lake which has a shore line of 105 miles. Hayden, Spirit and Twin Lakes are some of the smaller lakes particularly adapted to recreational purposes. All of these lakes have long been favorite resort areas of residents of the Inland Empire. In recent years a noticeable increase in recreational development has been experienced and is expected to continue as the metropolitan area as Spokane continues to grow.

An elongated glacial deposit, known as the Rathdrum Prairie, is situated in the northwestern part of Kootenai County and extends from Athol in a southwesterly direction to the Washington state line west of Post Falls. This area has been largely devoted to dry land wheat farming; however, part of the area in the vicinity of Hayden Lake and Post Falls has been irrigated in the past from Hayden Lake and Twin Lakes. Due to the inadequacy of the irrigation facilities which were installed in the early

days of the development, part of this irrigated area has had an insufficient supply of water and for this reason the project has not been an outstanding success. A new pumping station and system of ditches is at present being constructed in the vicinity of Post Falls. This will provide adequate water from the Spokane River for irrigating approximately 3,500 acres, 2,000 of which are part of the old Post Falls Irrigation District. A revival of interest in irrigation is expected to develop within the next five years which may ultimately result in a sizeable increase in the number of acres of dry land being irrigated. This will depend largely on whether or not the proposed dam to be constructed on the Coeur d'Alene River near Springston becomes a reality.

The eastern part of the area (Shoshone County) is practically all mountainous and supports only 188 farms, according to the 1945 census report. A majority of these farms, are located in the St. Joe and Coeur d'Alene River valleys. This area, along the south fork of the Coeur d'Alene River extending from Kellogg to Mullan, supports one of the largest silver and lead mining areas in the world. All of the mining development is now being supplied with electric power by the Washington Water Power Company and it is not contemplated that the cooperative will extend its system into Shoshone County.

The northwestern corner of Kootenai County is traversed by the Spokane International and the Northern Pacific Railroads which have branch lines extending into the city of Coeur d'Alene. The southern part of the area is served by the Union Pacific and the Chicago, Milwaukee and St. Paul Railroads. Railroad facilities in the area are adequate for the transportation of freight; however, passenger traffic is handled almost exclusively by busses. An airline operates a daily schedule from Coeur d'Alene south to Boise and Lewiston. It is anticipated that this line will be extended north to Sandpoint and Bonners Ferry within the near future and that additional flights will be added as air travel increases.

ECONOMY OF THE AREA

Lumbering. The economy of the area is largely dependent upon the timber industry in most of its productive aspects. The Ohio Match Company operates a large sawmill for the manufacture of white pine timber into match stock. There are several permanently located sawmills situated in the western part of Kootenai County which operate on a sustained yield basis. Most of the timber is produced on the Coeur d'Alene National Forest, which covers the northern part of Shoshone County and most of the western part of Kootenai County.

Agriculture. Next to lumbering, agriculture is the principal economic activity of the area and it is increasing in importance. Wheat and small grains are raised commercially on approximately one-fourth of the farms in Kootenai County. These are situated for the most part on the Rathdrum Prairie and in the southwestern part of the county in the vicinity of Worley. The production of winter wheat has increased approximately 26 percent while the production of spring wheat has decreased approximately 50 percent during the last five years.

The irrigated tracts in the area are noted for the production of berries and fruits. The land in the lower Rathdrum valley, which will ultimately be brought under irrigation, is suitable for the production of garden vegetables such as Irish potatoes, broccoli, asparagus, cabbage, carrots and peas. The Worley County, particularly, excels in the production of peas. The County Extension Service has recently inaugurated a program advocating the raising of seed potatoes. While only a start in this direction has been made, it is anticipated that within a few years the county will be among the leaders in seed potato production. Cherries, peaches, pears, plums, apricots, grapes and apples are raised successfully in the area.

In 1944, gross farm incomes in Kootenai County averaged \$1,931 compared with average gross farm incomes in Benewah County of \$3,901. In the same year, approximately one-third of the operators in Kootenai County had gross farm incomes of over \$1500; approximately 44 percent of the operators in Benewah County had gross farm incomes of a like amount.

A comparison by groups of gross farm incomes in 1944 is shown below for Kootenai and Benewah Counties. 1/

Gross Farm Income in 1944	Percent of Farmers in Kootenai	Each Income Group Benewah
Under \$250	18.7	5.4
\$250 - 399	10.4	5.5
400 - 599	11.9	11.9
600 - 999	14.6	18.5
1,000 - 1,499	11.8	14.9
1,500 - 2,499	13.1	15.3
2,500 - 3,999	8.9	8.8
4,000 - 5,999	4.2	5.7
6,000 - 9,999	3.5	4.2
10,000 - 19,000	2.3	5.0
Over - 20,000	.6	4.8

Dairying. Dairying is of major importance and is becoming increasingly so. The sale of whole milk and cream accounts for the major cash income on approximately 500 farms. A majority of the dairy farms produce their hay requirements and in 1945 approximately 24,000 acres of hay of all kinds were harvested. The bulk of the milk products is marketed through three creameries in Coeur d'Alene which supply fresh milk requirements of Coeur d'Alene, Kellogg, Wallace and Mullan. The extent of increase in dairying in Kootenai County during the last five years is illustrated by the following figures: total milk produced increased approximately 10 percent; whole milk sold increased almost 100 percent, while pounds of butter fat sold as cream decreased approximately 29 percent.

1/ U. S. Census, Agriculture, 1945

These statistics illustrate the transition from the production of cream sold (either sweet or sour) to milk products manufacturing plants, to production of whole milk sold for the fresh milk market. Production of whole milk to be consumed as such requires extensive use of hot water for cleaning dairy utensils as well as refrigeration for controlling the bacteria count, requiring a much higher consumption of electrical energy on dairies that sell whole milk than the energy consumption of dairies that sell sweet cream.

Poultry. Poultry production throughout the area has not been of primary importance in the past, although a majority of farms raise an average of approximately 150 chickens of various kinds. There are at least three commercial hatcheries located within the corporate limits of Coeur d'Alene. One large farm and hatchery in the vicinity of Post Falls raising leghorns is now served by the Washington Water Power Company. Feed purchased for livestock and poultry in Kootenai County approximately doubled in dollars within the last five years. Although nothing approaching self-sufficiency may be looked for, it is expected that in the future a greater percentage of feed for poultry and livestock will be raised locally than is now the case.

Mining. As stated previously the mineral areas of Shoshone County are among the largest in the world in the production of lead, zinc, and silver. Inasmuch as the mining areas are now adequately served with central station power it is not anticipated that mining will contribute much to the future magnitude of electric loads to be served by the cooperative. There are numerous small claims scattered throughout the eastern part of Kootenai County but at present there are no producing mines.

Recreation. Spirit, Twin, Hauser, Coeur d'Alene and the lower end of Pond Oreille Lakes all contribute to make Kootenai County one of the

most attractive recreational areas in the entire Northwest, being especially popular with people from Spokane County, Washington and from the mining sections of Shoshone County, Idaho. Coeur d'Alene, situated at the lower end of Coeur d'Alene Lake, is known as the "Lake City". Hayden Lake, with its excellent fishing and beautiful setting, is the site of one of the finest country clubs and summer colonies in the Northwest. Many of the desirable lake shore sites suitable for summer homes have not been developed. However, at present, a phenomenal boom in lake shore real estate is being experienced. It is anticipated that the next five years will see an extensive building program in seasonal lake shore cottages.

Summary. In summary, the economy of the area during the next ten years will continue to be based on lumbering, agriculture (principally dairy products that will be consumed as whole milk in Kootenai and Shoshone Counties), recreation, and to some extent on mining. The survey indicates a bright future for the cooperative if adequate low cost power is made available and if the cooperative pursues an aggressive power use policy in order to take full advantage of the opportunities described.

SOURCES OF SUPPLY

Originally the cooperative purchased its power requirements from the Washington Water Power Company through a substation located at the northeastern limits of the town of Coeur d'Alene. During the early part of the war arrangements were made to purchase Bonneville power which is transmitted over the lines of the Washington Water Power Company by means of a wheeling arrangement at a cost of a maximum of 3.5 mills per KWH to the cooperative. This wheeling arrangement will remain in effect for eighteen months after the official declaration of the end of the war at which time the cooperative will be obliged to make other arrangements for Bonneville power.

Present and proposed development of the cooperative's system indicates that the future delivery of power would be better made at a point west of Coeur d'Alene, as indicated on the attached Drawing No. 1, designated as Delivery Point No. 1, and at a point in the vicinity of Harrison, Delivery Point No. 2, when such an arrangement becomes feasible.

OTHER UTILITIES

The Washington Water Power Company, with headquarters in Spokane, Washington, operates extensively throughout the area and serves the principal cities and towns. The distribution systems in Spirit Lake, Rathdrum, Post Falls, Coeur d'Alene, St. Marion, Kellogg, Wallace and Mullan are all owned and operated by this company. Each of the towns of Plummer, Worley and Harrison owns and operates its own electric distribution system and purchases power, either directly or indirectly, from the Washington Water Power Company.

The Washington Water Power Company operates several hydroelectric generating stations located on the Spokane River and transmits power over two 110,000 volt transmission lines across Kootenai County to serve the tremendous mining developments in the vicinity of Kellogg and Wallace, Idaho. In addition the company has an arrangement for the interchange of power with the Montana Power Company at a substation located approximately 4 miles north of Mullan. Available information indicates that this arrangement is unsatisfactory due to the fact that insufficient power is available from either utility. The Montana Power Company feeds into this substation with two 100,000 volt transmission circuits.

Prior to 1940 the Washington Water Power Company pursued a policy of charging rural consumers for the construction of distribution lines and as a result very few farms in the more sparsely settled rural areas received service from this company. At the present time a more liberal policy is in operation and the company is aggressively soliciting rural consumers to the detriment of the cooperative. Lines are being extended by the power company without charge to the consumer up to distances in excess of one-half mile per consumer and as a result of this, combined with low rates offered by the company, approximately 60 consumers in the area who were

originally signed members of the cooperative have been served since January 1, 1946 by the Washington Waper Power Company.

The village of Plummer, with a population of approximately 300, owns its own distribution system and purchases power from the Washington Water Power Company at a metering point in the vicinity of Tekoa, Washington, from which point power is transmitted over a 6900 volt 3-phase line owned by the village of Plummer. The village of Plummer then resells electrical energy to the village of Worley. Approximately 100 village consumers, 30 rural farms and 40 seasonal consumers located at Chatcolet Lake, and those of Coeur d'Alene Indian Agency, are now being served by the Plummer system, exclusive of the Worley system. Accurate data as to the number of consumers, kilowatt demands and kilowatt hour consumption are not available at this time.

As stated above, the village of Worley owns and operates the 6900 volt single-phase line extending from the corporate limits of Plummer to Worley. The cooperative has secured approval and an allotment of funds from the Rural Electrification Administration to purchase all of the electric distribution facilities now owned by the village of Worley. 1/ In addition to 70 village consumers, approximately 10 farms receive electric service from the 6900 volt single-phase line. A complete analysis of this acquisition was prepared by the Bonneville Power Administration in October 1945. Details of the report are discussed in another section of this report.

1/ Subsequent developments indicate that the cooperative may acquire only the 6900 volt line from Plummer to Worley and may supply power to the village of Plummer on a wholesale basis.

The village of Harrison, located on the eastern shore of Coeur d'Alene Lake near the mouth of the Cocur d'Alene River, has a population of approximately 500. The electric distribution system is municipally owned and operated and power is purchased from the Washington Water Power Company at the company's O'Gara substation, which is approximately 5 miles south of the village of Harrison. Power is transmitted over a 2300 volt 3-phase line from this point to the town of Harrison and extends beyond the town in a northeasterly direction serving the community of Springston, a small sawmill and numerous farms along the line. Information furnished by the town of Harrison indicates that a total of 140,956 kilowatt hours were sold during the year of 1945. The maximum demand encountered during that period was 85 kilowatts. A total of 141 consumers were served, 25 of which were in rural areas. Cost of energy to the town was approximately 10.5 mills per kilowatt hour. Gross revenue to the town from sales was \$7,209.11.

The huge Farragut Naval Base is located at the north end of the county on the southern tip of Pend Oreille Lake. At the present time the Bonneville Power Administration furnishes the power requirements of the training station base. Bonneville power is picked up from the Washington Water Power Company transmission system at a point approximately 2 miles east of Spirit Lake and transmitted over a 69,000 volt line to a 6,000 KVA substation (both owned by Bonneville Power Administration) located at the training station. The load at the naval training base has decreased from a maximum of approximately 5,000 kilowatts, during the peak war training period, to approximately 3,700 kilowatts at present. It is entirely possible that eventually the facilities will be utilized to some extent on a demand which can be served by the cooperative.

During and after construction of the Farragut Naval Training Station a community was established near the southwestern limits of the base enclosure. This village, known as Farragut Village, is composed of apartment houses and dwellings, naval dormitories, a cafeteria, barber shop, school and telephone exchange. All of the power requirements of this village are supplied by the cooperative. During March 1945 a total of 506 consumers was served. As of March 1946 this number had decreased to 451 and present indications point to a drastic reduction in the number of consumers to be served in Farragut Village, depending to a large degree on the ultimate disposition of the base facilities.

Three other Rural Electrification Administration financed electric cooperatives serve the areas adjacent to those shown on Drawing No. 1. These are: (1) the Inland Empire Rural Electrification Association, with headquarters in Spokane, Washington, serving the area west of the Washington state line; (2) the Northern Idaho Rural Electrification Rehabilitation Association, serving the area in Bonner County to the north; and (3) the Clearwater Valley Light and Power Association, serving the larger part of Benewah County to the south.

A range of hills, extending from the Washington state line to about two miles south of St. Maries, forms a natural dividing line between the Kootenai Rural Electrification Association area and the Clearwater Valley Light and Power Company area. A very sparsely settled farm area along the St. Joe River, from the Head of Navigation to St. Joe in Shoshone County, is completely isolated from the lines of the cooperative because the more thickly settled section between St. Maries and the Head of Navigation, which was originally signed with the cooperative, is now being served by the Washington Water Power Company. A similar situation exists along the Cocur d'Alene River from Kingston to Pritchard. This area has been denied

service from the cooperative's lines because of (1) the refusal of the Washington Water Power Company to provide an additional point of delivery in the area, and (2) the construction of lines by the power company to a group of consumers along the Coeur d'Alene River from Cave Lake to Rose Lake, who originally were signed members of the cooperative.

RATES

In order to present a clear picture of competitive retail rates in effect throughout the area copies of the rates of the Washington Water Power Company, the Kootenai Rural Electrification Association and the municipalities of Worley and Harrison follow:

Washington Water Power Company

Schedule 3 - Rural Residential, Monthly Rate

90¢	for the first	14 KWH or less
3.6¢	per KWH for the next	50 KWH
2¢	per KWH for the next	50 KWH
1¢	per KWH for the next	186 KWH
0.6¢	per KWH for the next	600 KWH
1¢	per KWH for all additional	KWH

Where the demand is in excess of 7.5 KW, add 80 KWH to the 2¢ block of the rate for each 0.5 KW of demand in excess of 7.5 KW of demand.

Minimum: 90¢, unless a higher minimum is required under contract for a line extension.

Demand: Highest 15 minute demand during the month as determined by demand meter.

Schedule 13 - Rural Commercial, Monthly Rate

90¢	for the first	14 KWH or less
3.6¢	per KWH for the next	186 KWH*
2.5¢	per KWH for the next	300 KWH*
1.3¢	per KWH for the next	3,000 KWH
0.9¢	per KWH for the next	15,000 KWH
0.6¢	per KWH for the next	50,000 KWH
0.3¢	per KWH for all additional	KWH

* Add 30 KWH for each KW of demand in excess of 7.

Minimum: 90¢, plus \$1.00 for each KW of demand in excess of 7, but not less than \$2.50 for three-phase service; unless a higher minimum is required under contract to cover special conditions.

Demand: Highest 15 minute demand during the month as determined by demand meter.

Schedule 2 - City Residential, Monthly Rate

65¢	for the first	12 KWH or less
3.4¢	per KWH for the next	50 KWH
2¢	per KWH for the next	50 KWH
1¢	per KWH for the next	188 KWH
0.6¢	per KWH for the next	600 KWH
1¢	per KWH for all additional	KWH

Minimum: 65¢

Washington Water Power Company - cont'd

Schedule 12 - City Commercial Monthly Rate

65¢	for the first	12 KWH or less
3.4¢	per KWH for the next	188 KWH*
2.3¢	per KWH for the next	300 KWH*
1.2¢	per KWH for the next	3,000 KWH
0.9¢	per KWH for the next	15,000 KWH
0.6¢	per KWH for the next	50,000 KWH

* Add 30 KWH for each KW of demand in excess of 7.

Minimum: 65¢, plus \$1.00 for each KW of demand in excess of 7, but not less than \$2.50 for three-phase service; unless a higher minimum is required under contract to cover special conditions.

Demand: Highest 15 minute demand during the month as determined by demand meter.

Kootenai Rural Electrification Association

Schedule A - Farm and Home Service

First 40 KWH, or less, per month	@ \$3.00
Next 60 KWH per month	@ 4.5¢ per KWH
Next 100 KWH per month	@ 2.5¢ per KWH
Next 100 KWH per month	@ 1.5¢ per KWH
Over 300 KWH per month	@ 0.75¢ per KWH

Minimum: \$3.00 per month plus 75¢ per kva over 3 kva transformer capacity required.

Non-Farm - Minimum charge: 25 KWH, or less, per month @\$2.00

Schedule B - Commercial & Industrial Lighting & Power Service

Energy Charge

First 40 KWH per month	@ 7.5¢ per KWH
Next 60 KWH per month	@ 4.5¢ per KWH
Next 400 KWH per month	@ 3.0¢ per KWH
Next 1,000 KWH per month	@ 1.5¢ per KWH
Next 13,500 KWH per month	@ 0.8¢ per KWH
Over 15,000 KWH per month	@ 0.5¢ per KWH

Provided, however, that if the billing demand exceeds ten kilowatts, all kilowatt-hours used in excess of 360 times the measured demand in kilowatts shall be billed at the rate of 0.25¢ per KWH.

Demand Charge

First 10 kilowatts of billing demand per month, no demand charge. Excess above 10 kilowatts of billing demand per month at \$1.30 per kilowatt.

Kootenai Rural Elec. Ass'n - cont'd

Farragut Village Rate

First	25 kwh, or less, per month	@ 4.0¢ per kwh
Next	60 kwh, per month	@ 3.0¢ per kwh
Next	115 kwh, per month	@ 2.0¢ per kwh
Over	200 kwh, per month	@ 1.5¢ per kwh
Minimum monthly charge:		\$1.00

Village of Worley

Residential Rate

First	20 kwh per month	@ 10¢ per kwh
Next	30 kwh per month	@ 3¢ per kwh
Over	50 kwh per month	@ 2¢ per kwh
Minimum monthly charge:		\$1.00

Commercial Rate

First	20 kwh per month	@ 10¢ per kwh
Next	200 kwh per month	@ 3¢ per kwh
Over	220 kwh per month	@ 2¢ per kwh
Minimum monthly charge:		\$2.00

City of Harrison

Residential & Commercial Rate

First	15 kwh per month	@ 10¢ per kwh
Next	15 kwh per month	@ 8¢ per kwh
Next	15 kwh per month	@ 4¢ per kwh
Over	45 kwh per month	@ 3¢ per kwh
Minimum monthly charge:		\$1.00

Motor Rates

\$3.50 per horsepower connected load plus 1.5¢ per kwh
Minimum Monthly charge: \$1.75

Water Heaters

Flat Rate \$4.00 per month

From the foregoing it can be seen that the cooperative's farm rate is considerably higher than that of the Washington Water Power Company (40 kwh for \$3 as compared to 79 kwh for \$3.)

From the operating statistics for March 1946, the following tabulation of each class of consumer was made according to location on the cooperative's system, that is, the Harrison Line, South Line, North Line or Farragut Village:

FARMS

<u>KWH Consumption</u>	<u>Number of Consumers</u>			<u>Total</u>
	<u>South Line</u>	<u>Harrison</u>	<u>North Line</u>	
0-30	36	9	35	80
31-40	39	10	55	104
41-50	18	13	19	50
51-60	25	6	32	63
61-70	21	6	13	40
71-80	15	6	15	36
81-90	13	3	13	29
91-100	10	3	8	21
101-150	20	7	18	45
151-200	10	4	7	21
201-250	2	2	4	8
251-300	2	1	2	5
301-350	1	1	5	7
351-400	2	1	3	6
401-500	5	1	6	12
501-1000	6	2	5	13
1001-2000	2	0	1	3
Total	227	75	241	543
Average KWH	109	103	102	105

NON-FARM

0-30	2	20	22
31-40	1	10	11
41-50	1	4	5
51-60		2	2
61-70		4	4
71-80		7	7
81-90		2	2
91-100		4	4
101-150		4	4
151-200		2	2
201-250			0
251-300		1	1
301-350			0
351-400			0
401-500			0
501-1000		3	3
1001-2000			0
2001-3000		1	1
Total	4	34	68
Average KWH	28	127	122

SEASONAL (August 1945)

<u>Consumption</u>	<u>Number of Consumers</u>			<u>Total</u>
	<u>South Line</u>	<u>Harrison</u>	<u>North Line</u>	
0-30	9		19	28
31-40			4	4
41-50	2		5	7
51-60	3		1	4
61-70			3	3
71-80	1		5	6
81-90			2	2
91-100	3		2	5
101-150	6		5	11
151-200	4		3	7
201-250	3		2	5
251-300			3	3
301-350	1		1	2
351-400	2			2
401-500	1		1	2
501-1000	3	1	1	5
1001-2000				
2001-3000				
Total	<u>38</u>	<u>1</u>	<u>57</u>	<u>96</u>
Average KWH	175	750	98	133

COMMERCIAL

0-30	8	2	10	20
31-40			4	4
41-50			1	1
51-60			1	1
61-70			1	1
71-80	1		2	3
81-90	1		1	2
91-100		1		1
101-150	1		3	4
151-200	1		2	3
201-250		1	1	2
251-300		1	6	7
301-350				0
351-400			3	3
401-500			1	1
501-1000	3	1	6	10
1001-2000			6	6
2001-3000			2	2
3001-4000				0
above 4001			<u>2</u>	<u>2</u>
Total	<u>15</u>	<u>5</u>	<u>52</u>	<u>73</u>
Average KWH	189	229	1010	542

FARRAGUT VILLAGE

RESIDENTIAL

<u>KWH</u> <u>Consumption</u>	<u>Number of Consumers</u>		<u>Average Consumption KWH</u>	
	<u>March 1946</u>	<u>March 1945</u>	<u>March 1946</u>	<u>March 1945</u>
0-25	35	21	455	273
26-40	36	45	1188	1485
41-40	48	66	2160	2970
51-60	63	106	3455	5830
61-70	67	52	4355	3380
71-80	50	65	3750	4875
81-90	33	32	2805	2720
91-100	32	37	3040	3515
101-150	64	56	8000	7000
151-200	12	15	2100	2625
201-250	3	1	675	225
251-300		1		275
301-350		1		325
Total	<u>443</u>	<u>498</u>	<u>31993</u>	<u>35498</u>
Average KWH Consumption			72	71

COMMERCIAL

	<u>KWH Consumption</u>	
	<u>March 1946</u>	<u>March 1945</u>
Telephone exchange	942	490
School	1138	754
Barber shop	1213	1050
Street lighting	2000	1083
Cafeteria	5520	6400
Navy dormitories	<u>9442</u>	<u>10844</u>
Total	<u>21255</u>	<u>14621</u>
Average	3542	2437

TYPES OF LOADS TO BE SERVED

The loads which are served now, or which may be served in the future, by the cooperative are discussed in the following pages. As materials become available and feasibility is established, the cooperative contemplates an extensive construction program to serve the remaining number of unserved farms and other loads.

Farms. Present cooperative loads in the area are for the most part comprised of farm improvements and very small rural communities. The extent to which area coverage has been attained is reflected by the fact that out of a total of approximately 1700 farms in Kootenai County, 523 farms in Benewah County, and 188 farms in Shoshone County, the Kootenai Rural Electrification Association was serving in March 1946 a total of only 542 farms. Approximately 700 farms in the cooperative's service area are, or will be served by the Washington Water Power Company within the next two years.

During the past four years, consumption of electricity by farm users has been greatly retarded by the unavailability of appliances and electric farm equipment. An analysis of the operating records of the cooperative indicates that during March 1946 a total of 542 farms were served having an average monthly consumption of 105 kilowatt hours each. During the same period a total of 531 non-farm (including Farragut Village and seasonal consumers) were served having an average monthly consumption of 76 kilowatt hours each. The consumption of the foregoing class of consumers was augmented by 79 commercial consumers having an average monthly consumption of 660 kilowatt hours each and 2 other consumers averaging 165 kilowatt hours each per month. (See analysis by feeder lines included in the foregoing section under "Rates").

In order to arrive at a basis to be used in estimating the extent of future increase in the use of electricity by farm members, consideration has been given to the expected increase in saturation of the various appliances among the members of this cooperative. Results of the questionnaire returns from the survey conducted by the Northern Idaho Rural Electrical Rehabilitation Association, an REA cooperative operating in an adjoining area, indicate that the saturation of major appliances will be almost doubled in most instances and tripled in the case of electric ranges as soon as these appliances become generally available. A similar trend in increased usage of electricity for domestic and farm purposes is expected on this cooperative.

Based on information contained in this report it is estimated that the monthly consumption per farm member will approximate an average of 200 kilowatt hours per month at the end of two years, 300 kilowatt hours per month at the end of five years and 500 kilowatt hours per month at the end of ten years.

Attention is directed to the fact that energy consumption resulting from the use of electrically operated hay curing equipment has not been included in the estimates set forth in the foregoing paragraph. Since the agricultural economy of the area is closely geared to small dairy farms which sell whole milk in Coeur d'Alene, Kellog, Wallace and Mullan, considerable quantities of alfalfa and other types of tame hay are raised by dairymen as feed. It is estimated that there are approximately 500 dairy farms in the area, each supporting herds of 10 or 12 cows. Competent local agriculturalist believe that hay drying will be widely accepted as a means of increasing the nutrient value of hay with a resultant increase in the quality of milk produced. It is the aim of the dairy men to increase their

herds to an average of 20 milk cows, necessitating the maintenance of approximately 30 head of dairy stock. Based on the assumption that approximately 3.0 tons of hay per cow per year are required, it would be necessary to produce approximately 90 tons of hay to maintain the stock on each dairy farm. Under normal conditions approximately 50 kilowatt hours of electrical energy are required to mow cure one ton of hay. On this basis the average hay drier would consume approximately 4,500 kilowatt hours per year. In order to be conservative, the average consumption per hay drier is estimated at 3,500 kilowatt hours per year and it is assumed that an additional 1,500 kilowatt hours will be used in miscellaneous feed grinding operations. It is estimated that the cooperative will serve 20 hay driers at the end of two years, 75 at the end of five years, and 150 at the end of ten years.

In tabulating the estimated average consumption of electrical energy on the farms, the consumption of electrical energy and kilowatt demands for hay drying has been pro-rated among the total number of farms to be served at the end of two, five, and ten years. Tables I and II include energy consumption for hay drying as well as for domestic and other farm equipment usages. Therefore, the values used in Tables I and II for "farms" are based on higher monthly consumption per farm member than that stated previously above, namely:

210 kilowatt hours per month in 2 years

330 kilowatt hours per month in 5 years

550 kilowatt hours per month in 10 years.

It is estimated that the average demand per farm consumer at peak load, including hay driers, will be: 1/

1/ Demand values given for estimate purposes in this report are derived from Engineering Memorandum No. 33R3 of May 20, 1946, Subject: Voltage Regulation. Rural Electrification Administration, USDA.

	<u>Table I</u>	<u>Table II</u>
Within 2 years	0.75 KW	0.90 KW
Within 5 years	1.10 KW	1.25 KW
Within 10 years	1.75 KW	2.2 KW

Non-Farm. During the war years the cooperative served a maximum of 668 non-farm members (including seasonal consumers), the majority of whom were situated in Farragut Village and in the Village of Athol. A scattered few of the members were located in settlements such as Dalton Gardens and Hayden, adjacent to Coeur d'Alene. It is estimated that the discontinuance of the Farragut Naval Training Station will result in a drastic decrease in the number of non-farm consumers to be served by the cooperative. The estimates in Tables I and II are predicted on the assumption that all of the non-farm consumers in Farragut Village and one-half of the non-farm consumers in Athol will be disconnected from the cooperative's lines as a direct result of the closing of the base.

During the month of March 1946, a total of 67 non-farm consumers (exclusive of Farragut Village) were served having an over-all average consumption of 122 kilowatt hours. In Tables I and II it is estimated that non-farm consumption will attain an average monthly consumption of 150 kilowatt hours within two, 200 kilowatt hours within five and 250 kilowatt hours within ten years' time. Similarly, it has been estimated that the average demand per non-farm consumer at peak load will be:

	<u>Table I</u>	<u>Table II</u>
Within 2 years	.6 KW	.6 KW
Within 5 years	.75 KW	.8 KW
Within 10 years	.9 KW	1.0 KW

Seasonal Cottages. As stated previously the numerous lakes of Kootenai county provide ideal sites for summer homes. During the past few years a phenomenal boom has been experienced in the sale of lake shore real estate

and cottages are being built as rapidly as building materials can be obtained. It is anticipated that summer cottage construction will go forward at an unprecedented rate when the supply of building materials catches up with the demand.

During August 1945, the most recent month which reflects seasonal cottage loads, the cooperative served a total of 96 summer cottages and camps having an averaged consumption of 133 kilowatt hours. Most of the cottages are in use from four to five months each year and reflect an unusually high consumption for this type of consumer. This is attributable to the fact that a majority of the cottages are owned by people of means who can afford electric appliances and radiant heaters. Many cottages are owned by extremely wealthy people who are concerned more with the comforts of electrical living than with the expense involved. This is evidence by the case of one summer home which is equipped with two large electric ranges and three electric refrigerators in addition to numerous Wessix-type heaters which are ideal throughout the summer for taking the chill off early morning and late evening hours. This particular consumer averaged in excess of 7,000 kilowatt hours per year during the pre-war years.

An analysis of the cooperative's records indicates that the following consumption can be expected of seasonal consumers:

<u>Consumers Per 100</u>	<u>Average Annual Consumption</u>	<u>Total Annual Consumption</u>
3	4,000	12,000
60	2,000	120,000
10	1,000	10,000
7	400	2,800
<u>20</u>	<u>250</u>	<u>5,000</u>
100		149,800

Average annual consumption: 1498 KWH

Based on the above analysis it is estimated that the combined average annual consumption of seasonal cottages, resorts and organizational camps will be 1,500 kilowatt hours within two years, 2,150 kilowatt hours within five years and 2,200 kilowatt hours within ten years. Similarly, it is estimated that the average demand of seasonal consumers will be:

	<u>Table I</u>	<u>Table II</u>
Within 2 years	0.4 KW	0.6 KW
Within 5 years	0.5 KW	0.7 KW
Within 10 years	0.6 KW	0.8 KW

From information available from varied sources, it is estimated that the cooperative will serve a total of 365 seasonal consumers within two years, 625 within five years and 900 within ten years' time. These estimates are broken down as follows for each lake shore area:

<u>Location</u>	<u>Est. number Cottages 1956</u>
South shore of Spirit Lake	35
North shore of Twin Lakes	150
South shore of Twin Lakes	40
Hauser Lake	75
West side of Hayden Lake	35
Northeast side of Hayden Lake	60
East side of Hayden Lake	100
Pay View (Pend Oreille Lake)	<u>25</u>
Total	520
<u>West side of Coeur d'Alene Lake:</u>	
Stevens Point to Mica Bay	50
Rock Point	30
Loffs Bay (including Episcopal Church camp)	10
Pilot Rock	10
Black Rock	20
Rockford Bay	20
Windy Bay (including Girl Scout camp)	10
Windy Bay to Cottonwood Bay	15
Cottonwood Bay to Conkling Park	40
Chatcolet	<u>25</u>
Total	230
<u>East Side of Coeur d'Alene Lake:</u>	
Beauty Bay to Squaw Bay	30
Squaw Bay to Echo Bay (including Arrow Boys' camp)	5
Driftwood Point to Turner Bay	5
Turner Bay to Carlin Bay	40
Carlin Bay to Half Round Bay	30
Powder Horn Bay to Harrison	10
Echo Bay to Driftwood Point (including Boy Scout camp)	<u>30</u>
Total	150
Grand Total	<u>900</u>

From the above estimates it can be seen that much of the future development of the cooperative will be dependent upon the development of recreational facilities in the area. It is anticipated that a majority of seasonal cottages will be equipped with major electrical appliances as well as with pressure water systems and Wessix-type heaters.

Commercial Consumers. During the month of March 1946 the cooperative served a total of 73 commercial consumers. These consisted largely of country stores, filling stations, cafes and taverns, and averaged 542 kilowatt hours per month. Of this number, 52 were on the North Line, averaging 1,010 kilowatt hours; 15 were on the South Line, averaging 189 kilowatt hours; and 6 were on the Harrison Section, averaging 229 kilowatt hours per month. The high consumption per commercial consumer registered on the North Line is attributable to a large extent to the taverns in the vicinity of the Farragut Naval Training Base. With the closing of the base, it is estimated that a reduction in these consumers may be experienced. However, an increase in commercial consumers will be noted because the cooperative has under construction, at present, approximately 286 miles of line which, when completed, will offset this decrease. Furthermore, it is understood that negotiations are being conducted for utilizing the facilities of the Farragut Base to convert it into a "GI" college. It is estimated that the cooperative will be serving a total of 80 commercial consumers within the next two years, 95 within the next five years and 110 within the next ten years. In the event that establishment of the "GI" college should not materialize, it may be expected that the high consuming commercial accounts in the neighborhood of Farragut will in all probability be disconnected and that the new commercial accounts will be small stores and filling stations. Accordingly, the average monthly consumption per commercial consumer is conservatively estimated at 350 kilowatt hours within two years, 500 kilowatt hours within five years and 700 kilowatt hours within ten years. These estimates are based largely on the increasing utilization of air conditioning, refrigeration and lighting to be installed by rural stores, cafes and filling

stations during the next ten years. It is estimated that average demands per commercial consumer will be:

	<u>Table I</u>	<u>Table II</u>
Within 2 years	1.2 KW	1.4 KW
Within 5 years	1.5 KW	1.7 KW
Within 10 years	2.4 KW	2.75 KW

Irrigation. Widespread interest in irrigation has been manifest with fruit and vegetable growers in the past few years as well as with dairy farmers who raise alfalfa hay for feed. In the Hayden and Post Falls areas, approximately 2,000 acres have been under irrigation by means of gravity ditches. Because of the inadequacy of the water supply occasioned by the lowering of the water level in Hayden Lake and the Spokane River, part of this project has been inoperative for the past few years. At the present time the Bureau of Reclamation is constructing facilities for placing approximately 1,500 additional acres under irrigation, and to provide, also, adequate water for the original 2,000 acres. This project entails the pumping of water out of the Spokane River above the Post Falls generating station of the Washington Water Power Company into a system of gravity ditches entailing likewise the leveling of farm land to facilitate the application of water. A 1200 horsepower pumping unit is being installed which will be served by the Washington Water Power Company.

It is the consensus of informed local opinion that the Springston Dam, to be located on the Coeur d'Alene River, will be constructed within the next ten years. This dam is to be constructed as a flood control reservoir for maintaining the level of Coeur d'Alene Lake and the Spokane River and will provide sufficient water throughout the dry months for irrigating an additional 3,500 acres of farm land in the Rathdrum Prairie.

The type of soil encountered in the area to be irrigated being a gravelly loam and of a limited depth is casting some doubt on the advisability

of leveling land for irrigation purposes. It is apparent on some parts of the area which have been leveled that the top soil has been removed to too great a depth leaving gravelly areas exposed which makes them unsuitable for the production of crops. For this reason agricultural authorities believe that the ultimate method of irrigating this rolling prairie will be by means of sprinkler irrigation systems, pumping water out of ditches and on to the crop land. At the present time, at least five such systems are being installed, two of which will be served by the cooperative's lines. Dealers in this type of equipment are actively promoting sales in the area and it is anticipated that at least twelve such installations will be served from the cooperative's lines within the next two years. It is estimated that this number will increase to 38 within five years and 100 within ten years. A definite poll of the members has not been taken but the cooperative is considering the circulation of a questionnaire similar to that circulated in Idaho 4 Bonner, which reflected a surprising interest in this type of irrigation, and it may be considered that 100 installations is a conservative estimate.

In addition to sprinkler irrigation systems being installed in connection with gravity ditches on the Rathdrum Prairie, it is anticipated that there will be installations for pumping water from the numerous small lakes and streams in the south and southeastern parts of Kootenai County. It is assumed that lifts will average from 10 to 50 feet and the average pump will be approximately 7 horsepower and will have a maximum demand of 6 kilowatts each with an average pumping period of 1000 hours per year. Applicable diversity factors have been applied in accordance with the formula set forth in load summaries in Tables I and II.

Lumbering. Lumber provides the chief source of income throughout Kootenai County. The Kanikau National Forest covers a small part in the northeastern corner of the county. The Coeur d'Alene National Forest includes approximately the eastern two-thirds of the county north of the Coeur d'Alene River and west of Hayden and Coeur d'Alene Lakes. Of particular value are the stands of white pine which are logged mostly by the Ohio Match Company which operates a large sawmill on the Spokane River east of Post Falls. Potlatch Industries operates a large mill located adjacent to the southeastern corner of Coeur d'Alene and secures most of its timber along the St. Joe and Coeur d'Alene Rivers, floating logs down the rivers and the Coeur d'Alene Lake to the mill. The Winston Lumber Company operates a large sawmill near the outlet of the Coeur d'Alene Lake. However, the mill's timber resources have been depleted to the extent that it will be shut down in the near future. One other medium sized sawmill is located at Post Falls.

The cooperative is now serving the lighting requirements of a sawmill located between Upper and Lower Twin Lakes. The operators of this mill have recently approached the cooperative requesting sufficient power to operate approximately 100 horsepower. The serving of this load will require the rephasing of approximately 9 miles of line likely to be undertaken within the next two years.

Another sawmill, cutting approximately 15,000 bd. ft. per day, is located adjacent to the cooperative's 3-phase line between Athol and Farragut Village. While no definite application for power has been made to the cooperative by the operators of this mill, present trends in the electrification of the lumber industry indicates that this mill will be electrified and served by the cooperative within the next ten years requiring an initial

installation of a minimum of 100 horsepower. It is estimated that the requirements of both of these mills will each be increased to 150 horsepower or more at the end of ten years.

In addition to the mills discussed above, there is a sawmill located at the head of Blue Lake. It is partially electrified and is served by the town of Harrison. Since it is anticipated that the municipal utility at Harrison will be acquired by the cooperative within the next five years, this sawmill has been included in the estimates of loads in Table II as requiring 100 horsepower within five years and 150 horsepower within ten years.

The timber requirements of all of the mills referred to above (except the Winston Lumber Mill) are being logged on a sustained yield basis and it is anticipated that all will become permanent industries.

Abundant stands of tamarack, lodgepole pine and fir provide suitable timber for poles and it is estimated that approximately 500,000 poles could be produced in the area annually on a sustained yield basis. A United States Forester is assigned at present to the task of devising a method by which marketable poles and logs on farm lands can be produced to the advantage of farmers. A solution is being worked out whereby a Farmers' Timber Products Cooperative will be formed to process and market all poles and logs produced on the farms. A recent survey indicates that approximately 100,000 poles of all species can be produced annually on the 68,000 acres of privately owned lands, not including the mature stands on national forests. It is quite probable that a cooperative pole peeling plant, and perhaps a sawmill having a load conservatively estimated at 100 kilowatts within five years and 200 kilowatts within ten years, will be established at an undetermined point along the cooperative's lines in Kootenai County.

The same timber survey has revealed a tremendous potential production of young bull pine suitable for apple tree props. These can be produced and marketed in the orchard areas of central Washington at a price less than that now paid for similar props. As an experiment the Great Northern Railroad has purchased and shipped two car loads of such props to Wenatchee, Washington, and it is probable that a timber products plant, requiring electric power, will result from the development of this resource. However, such a plant is not included in these load estimates.

Frozen Food Processing. This area has long been devoted to the production of soft fruits and vegetables but the crop season is late and such products usually reach the markets at a time when they are already glutted with products from earlier producing areas. For this reason orchardmen and vegetable farmers have deviated from the production of fruits and vegetables. However, a revival of this type of agriculture is practically a certainty. The Valley Frozen Foods, Inc., of Mount Vernon, Washington, is seeking suitable location for frozen food plants to process carrots, peas, berries and soft fruits. Negotiations have been entered into by local interests with this firm for the establishment of such a plant in the area north of Post Falls. The cooperative is taking an active part in the negotiations and it is anticipated that a frozen food processing plant will be established by this company within the next two years. As the success of this development becomes apparent it is probable that at least one additional plant will be established within the next ten years. It is estimated that this pilot plant will have an average maximum demand of at least 60 kilowatts for three months of the year and 15 kilowatts for the balance of the year. It is anticipated that the demand will increase to a minimum of 80 kilowatts within the next five years and that two such plants will be operating within ten years.

Fruit Canning Plants. Apples, peaches and pears can be produced abundantly throughout the area and one apple canning plant is now being operated at Post Falls, the power requirements of which are served by the Washington Water Power Company. It is conservatively estimated that another such plant will be established within the next five years, having a maximum demand of approximately 20 kilowatts and it is expected to increase to 30 kilowatts within the next ten years. Proper foresight and promotion on the part of the cooperative's officials should result in the plant being established on the cooperative's lines.

Potato Grading and Storage Cellars. As mentioned in the discussion of the economy of the area, an attempt is being made to introduce the raising of seed potatoes on a large scale. While only a small start has been made, local agriculturalists anticipate a sizeable development in the production of potato seed. It is conservatively estimated that from 2 to 3 thousand acres of seed potatoes will be produced in Kootenai County within the next ten years. In order to properly grade and process this crop it will be necessary to ultimately establish at least three grading and storage cellars and it is estimated that at least three such cellars will be in operation at the end of ten years.

Grain Elevators. The cooperative is now serving the power requirements of a grain elevator, located on the outskirts of Worley, having a capacity of 150,000 bushels, and one having a capacity of 125,000 bushels with storage facilities only, located at Setters in the south end of Kootenai County. The Worley elevator has grain grinding and cleaning facilities and in 1945 approximately 300,000 bushels of grain were processed. The total consumption from May 1945 to April 1946 was 11,384 kilowatt hours. The management of this elevator advises that it expects to further electrify the operations

and that the demand for electrical energy will be increased by at least 50 percent within five years and 100 percent within ten years. A like increase is expected to occur at the Setter elevator.

The local chapter of the Farmers' Union is contemplating the installation of grain storage, cleaning and grinding facilities in the vicinity of Rathdrum and it is positively assured that this elevator will be located along the cooperative's lines and will be built within the next five years.

Mines. Numerous mineral deposits are scattered throughout Kootenai County and the northern part of Benewah County. Large scale production has not yet been experienced. Numerous claims are being prospected, however, and the operators of one, located on Evans Creek on the southern boundary of Kootenai County, have made application to the cooperative for power to supply approximately 60 horsepower. It is anticipated that this development will be served within the next five years and that at least one additional prospect, in the vicinity of the north fork of Hayden Creek, will also be served within the next five years.

The extent of the mineral development in this area is unpredictable at this time, but it is felt that a conservative estimate of four such mining developments having a demand of at least 30 kilowatts each, is reasonable. It is highly possible that a mineral development approaching that of Shoshone County could take place along the cooperative's lines and should not be discounted in judging the feasibility of extending Bonneville transmission lines into the area.

Radio and Communication Towers. Due to the fact that no major broadcasting stations are beamed toward this area radio reception is very inadequate. The trend away from amplitude modulation and toward frequency modulation is expected to result in the installation of at least one broadcasting

station along the cooperative's lines within the next five years.

Considerable research into the sending of messages by wireless has recently been made by the Radio Corporation of America and recent releases by that company indicate that they have developed a system of radio towers to be located approximately 50 miles apart which will supplant present metallic circuits of the Western Union Telegraph Company. It is quite probable that at least one such communication tower will be installed in the area and will probably be served by the cooperative within the next ten years. Such loads are extremely desirable in that they have a high demand factor and a load factor approaching 100 percent.

Airway Beacons. The Northwestern Airline traverses Kootenai County from east to west and at present two CAA beacons are in operation, one on Mount Coeur d'Alene and the other on Mica Peak. Both installations are accessible from the cooperative's lines and it is probable that at least one beacon will be served within the next two years and the other within the next ten years. Since airways are constantly being expanded and adapted for night flying it is probable that additional beacons will be established along the north-south air line now being operated between Coeur d'Alene and Boise and later, perhaps, north to Sandpoint and Bonners Ferry, resulting in additional beacons being served from the cooperative's lines.

Peat Moss Processing. An extensive, boggy area in the west end of Twin Lakes, approximately three-fourths mile long and 1,000 feet wide, produces a luxuriant growth of peat moss. Residents of the Coeur d'Alene area have long utilized this peat moss as a mulch for shrubbery beds and miscellaneous horticultural uses. Available information indicates that high grade peat moss is marketed by horticultural establishments and national mail order houses at approximately \$2.75 for a 40-pound bale. A successful commercial

enterprise could be established to process and market this product and it is anticipated that such an industry will be established within the next five years, utilizing at least 20 kilowatts in electrical energy. The industry could very well expand to greater proportions than those estimated and should certainly be further investigated by cooperative officials and those interested in the development of the area.

ACQUISITIONS

As stated elsewhere in the report (see "Other Utilities"), the cooperative is negotiating for the purchase of the distribution facilities now owned and operated by the village of Worley. In November 1945, Mr. Owen W. Hurd, District Engineer, Upper Columbia District of the Bonneville Power Administration, made a complete investigation of the present and potential loads of this system. In the report it was forecast that the first post war year would result in an annual maximum demand of approximately 90 kilowatts and annual energy sales of approximately 210,400 kilowatt hours, based on an estimated average annual load factor of 33.4 percent. Table I of this report includes the village of Worley as an acquisition to be made not later than 1948, having a projected demand of 100 kilowatts in 1948, 125 kilowatts in 1951 and 187 kilowatts in 1956. The annual kilowatt hours sold were estimated at 300,500 kilowatt hours in 1948, 389,000 kilowatt hours in 1951 and 573,500 kilowatt hours in 1956.

The foregoing estimates reflect annual load factors of approximately 35 percent, which are slightly higher than the load factor used in the Bonneville estimates. Table I shows the estimated total kilowatt hours adjusted in order to round off and simplify the total amounts.

The distribution lines of the municipal system owned and operated by the village of Harrison cover an area situated in the south central part of the Harrison Section of the cooperative. Rates are high as compared with those of the cooperative but are necessarily so in order that the municipally owned utility can operate on a solvent basis. It is generally agreed that it would be very much to the advantage of the residents of the village, as well as to the cooperative, for the cooperative to acquire and operate this system. While no definite negotiations have been entered into at the present time it is quite probable that the distribution

lines of the village of Harrison will become part of the cooperative's system within the next five years. Based on this assumption the load in the village of Harrison has been incorporated in Table II to be acquired by 1951 and the demand is estimated at 200 kilowatts in that year and 250 kilowatts in 1956. It is further estimated that the annual consumption will be 613,000 kilowatt hours in 1951 and 760,000 kilowatt hours in 1956. These estimates are based on an annual load factor of approximately 35 percent.

ESTIMATE OF LOADS

Inasmuch as the project area is segregated into two sections by Coeur d'Alene Lake and by the intervening distribution line of the Washington Water Power Company, it is necessary to segregate the load estimates into two parts. Drawing No. I illustrates this separation and shows the location of two tentative points of delivery, viz., D.P. (Delivery Point) #1, located approximately $2\frac{1}{2}$ miles west of the city limits of Coeur d'Alene and D.P. #2, located approximately $1\frac{1}{2}$ miles east of Harrison.

Table I reflects the detailed estimates of maximum kilowatt demands and annual kilowatt hour consumption anticipated at D.P. #1 in 1948, 1951 and 1956. Table II reflects similar information at D.P. #2.

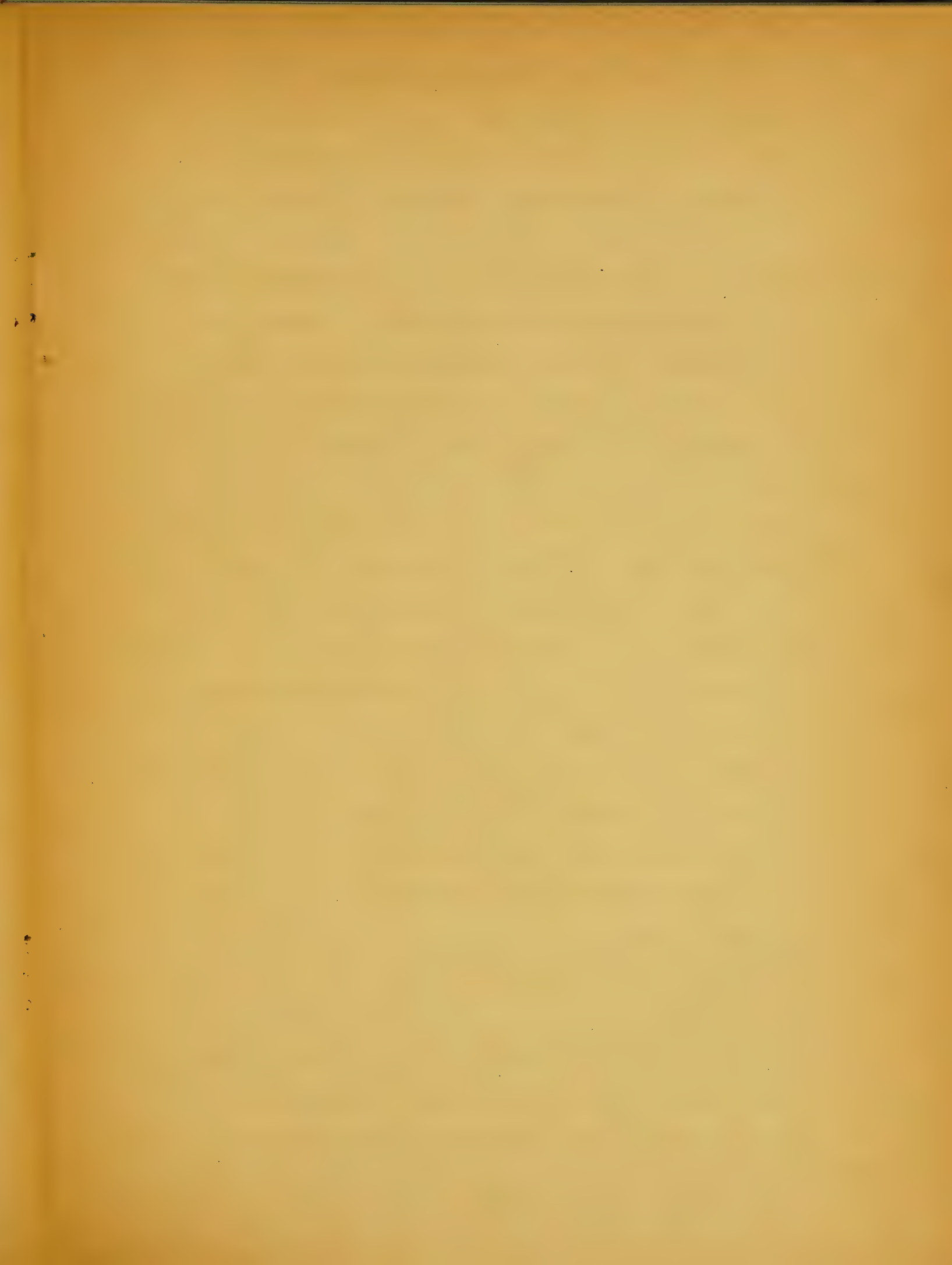
These estimates are broken down into the number of each type of consumer and show the maximum demand of, and the factor applied to each, in order to arrive at the proportion of kilowatt demand that each type of load contributes to the system total. For example, @30/2.F refers to a total estimated demand of 30 kilowatts and an overall factor of 2, which represents the demand factor of the individual load, plus diversity between loads of the same type and overall diversity between loads of different types when connected to the system. In this manner industrial loads can be reduced to a value which may be added arithmetically to the estimated average demands of farm, non-farm, seasonal and commercial consumers which have been arrived at through experience and the application of suitable estimated load factors to the estimated consumption of each of these types of consumers.

System losses have been applied in order to arrive at the total kilowatt hour requirements of the system and are based on the operating experience of the cooperative as reflected by the records. Annual system losses for the year 1945 were approximately 20 percent. System losses in

1948, 1951 and 1956 have been estimated at 18, 16 and 14 percent, respectively.

Table III reflects the combined present and future power requirements of the entire system and sets forth the calculated annual system load factors which may be anticipated as a result of the estimated load growth as shown in Tables I and II. A summary of these totals is shown at each of the Delivery Points on Drawing No. 1.





ESTIMATED ULTIMATE SYSTEM INVESTMENT

To arrive at a fair basis upon which a long range rate structure may be considered, it is necessary to arrive at an approximation of the ultimate investment in distribution lines which the cooperative must make.

Drawing No. I shows the present system, plus all ~~foreseeable~~ extensions that may be made within the next decade. A reasonable estimate of total miles of line may be arrived at on a density basis to which should be added the independent mileage which will be necessary to serve isolated 3-phase power loads, such as sawmills, mines, etc., and irrigation pumps.

Tables I and II reflect that a total of 1,175 farm, 90 non-farm, 900 seasonal and 110 small commercial consumers will be served by the cooperative by 1956. On the basis of an ultimate consumer density of 2 per mile for farm and small commercial consumers, and 7 per mile for seasonal and non-farm consumers, the following tabulation reflecting total ultimate miles of line is made:

Farms and commercial consumers	$\frac{1285}{2}$	=	643 miles
Seasonal and non-farm consumers	$\frac{990}{7}$	=	142 miles
Isolated sawmills, mines, etc. (dwg.#1)		=	12 miles
Irrigation pumps (average .3 miles each)		=	<u>30 miles</u>
Total			827 miles
Miscellaneous (approximately 3%)			<u>23 miles</u>
Grand Total			850 miles

A large percentage of this mileage will be comprised of 3-phase line in order to furnish adequate service to large consumers and to assure proper voltage regulation and balance of load on the system. Map mileages,

as reflected on Drawing No. 1, were scaled and the following estimates of

3-phase, 2-phase and single-phase lines were made:

Estimated 3-phase line	=	125 miles
Estimated 2-phase line	=	60 miles
Estimated 1-phase line	=	600 miles
Estimated services	=	65 miles
Total		<u>850 miles</u>

The following calculation of ultimate investment of the cooperative is based on line construction costs somewhat below prevailing contract prices in order to arrive at an average cost of construction between present day and prewar levels:

3-phase line	125 miles @ \$1400	-	\$ 175,000
2-phase line	60 miles @ \$1100	-	66,000
1-phase line	600 miles @ \$ 900	-	540,000
Services	65 miles @ \$1000	-	<u>\$ 65,000</u>
Total - Distribution Lines			\$ 846,000

Meters, etc., 2398 @ \$15	-	\$ 36,000
Acquisitions (Worley and Harrison)	-	24,500
Office furniture and fixtures	-	5,000
Transportation equipment	-	5,000
Office building	-	20,000
Laboratory equipment	-	1,000
Communication equipment	-	4,000
Miscellaneous tools and equipment	-	<u>2,000</u>
Total		\$ 97,500

General Overhead:		
Organization expense - 2398 @ \$5	-	\$ 12,000
Miscellaneous construction expense - 2%	-	19,000
Engineering & supervision - 5%	-	48,000
Legal expense - approximately 1%	-	9,500
Interest during construction - 2%	-	24,000
Taxes during construction - approx. 2%	-	<u>19,000</u>
Total - General Overhead		\$ 131,500

Sub-Total	\$1,075,000
Contingencies (approximately 5%)	<u>55,000</u>

Grand Total Investment \$1,130,000

It has been attempted in the foregoing estimates to arrive at the total investment by the cooperative necessary to serve only those loads enumerated in Tables I and II, without benefit of the detailed study which is necessarily a part of the "Ultimate System Study" to be prepared by the Cooperatives' Engineers.

TABLE I
LOAD ESTIMATES - DELIVERY POINT #1

TYPE OF CONSUMER	NO. OF CONSUMERS			MAXIMUM KW DEMAND			ANNUAL KWH CONSUMPTION		
	1948	1951	1956	1948	1951	1956	1948	1951	1956
FARMS (INCLUDING HAY DRIERS)	700	830	925	00.75	913	01.75	02,520	03,960	06,600
				0.6	0.75	0.9	01,800	02,400	03,000
NON-FARM (EXCLUSIVE OF FARRAGUT VILLAGE)	30	50	70	18	38	63	54,000	120,000	210,000
				00.4	00.5	00.6	01,500	02,000	02,400
SEASONAL COTTAGES	325	550	750	130	275	450	487,500	1,100,000	1,800,000
				01.2	01.5	02.4	04,200	06,000	08,400
COMMERCIAL	70	80	90	84	120	260	294,000	480,000	756,000
IRRIGATION PUMPS - 1,000 HRS. PER SEASON (AVERAGE 7HP - 6KW) (FACTOR: 0-50=1.43, 51-100=1.67, OVER 100=2.)	10	30	80	42	126	288	06,000	06,000	06,000
				06.0/1.43F	06/1.43F	06/1.67F	60,000	180,000	480,000
SAWMILLS (AVERAGE 100KW) 20,000 B.F.	1	1	2	80	80	240	0150,000	0150,000	0200,000
				0100/1.25F	0100/1.25F	0150/1.25F	150,000	150,000	400,000
CO-OP POLE PEELING & TIMBER PRODUCTS PLANT									
FROZEN FOOD PROCESSING	1	1	2	40	53	106	50,000	73,000	146,000
				060/1.5F	080/1.5F	080/1.5	50,000	73,000	146,000
FRUIT CANNING PLANTS									
POTATO GRADING & STORAGE CELLARS	1	2	3	2	4	6	05,000	05,000	05,000
				04/2.F	04/2.F	04/2.F	5,000	10,000	15,000
GRAIN ELEVATORS	2	3	3	20	45	60	012,000	018,000	024,000
				020/2.F	030/2.F	040/2.F	24,000	54,000	72,000
MINES (PROSPECTS BEING WORKED)									
RADIO STATIONS & COMMUNICATION TOWERS									
AIRWAY BEACONS	1	1	2	2	2	4	07,000	07,000	14,000
							7,000	7,000	14,000
PEAT MOSS PROCESSING									
ACQUISITION (VILLAGE OF WORELY)				100	125	187	300,500	389,000	573,000
TOTALS	1,141	1,553	1,934	1,043	1,906	3,519	3,192,000	6,201,000	11,272,000
PLUS ESTIMATED SYSTEM LOSSES							018%	016%	014%
SYSTEM TOTALS - D.P.#1							698,000	1,179,000	1,828,000
							3,890,000	7,380,000	13,100,000

TABLE II
LOAD ESTIMATES - DELIVERY POINT #2

IDAHO II KOOTENAI

TYPE OF CONSUMER	NO. OF CONSUMERS			MAXIMUM KW DEMAND			ANNUAL KWH CONSUMPTION		
	1948	1951	1956	1948	1951	1956	1948	1951	1956
FARMS (INCLUDING HAY DRIERS)	200	220	250	00.9	01.25	02.20	02,520	03,960	06,600
NON-FARM	10	15	20	0.6	0.8	01.0	01,800	02,400	03,000
SEASONAL COTTAGES	40	75	150	00.6	00.7	00.8	01,500	02,000	02,400
COMMERCIAL	10	15	20	01.4	01.7	02.75	04,200	06,000	08,400
IRRIGATION PUMPS - 1,000 HRS. PER SEASON (AVERAGE 7HP - 6KW) (FACTOR: 0-50=1.43 51-100=1.67, OVER 100=2.)	2	8	20	06/1.43F	06/1.43F	06/1.43F	06,000	06,000	06,000
SAW MILLS (AV. 100 KW - 20,000 B.F.)		1	1		0100/1.25F	0150/1.25F		0150,000	0200,000
MINES (PROSPECTS BEING WORKED)		1	2		030/2.F	030/2.F		050,000	050,000
AIRWAY BEACONS (AV. 2 KW)		1	1		2	2		07,000	07,000
ACQUISITION (VILLAGE OF HARRISON)					200	250		613,000	760,000
TOTALS				232	696	1,231	636,000	2,015,000	3,425,000
PLUS ESTIMATED SYSTEM LOSSES							018%	016%	014%
SYSTEM TOTALS - D. P. #2	262	336	464	232	696	1,231	776,000	2,400,000	3,985,000

1,141,100,000

TABLE III
LOAD ESTIMATES - SUMMARY

IDAHO II KOOTENAI

	MAXIMUM KW DEMAND			ANNUAL KWH CONSUMPTION			LOAD FACTOR		
	1948	1951	1956	1948	1951	1956	1948	1951	1956
DELIVERY POINT No. 1	1,043	1,906	3,519	3,890,000	7,380,000	13,100,000	42.5%	45.7%	42.5%
DELIVERY POINT No. 2	232	696	1,231	776,000	2,400,000	3,985,000	38.2%	39.4%	36.9%
TOTAL ESTIMATED SYSTEM LOAD	<u>1,275</u>	<u>2,602</u>	<u>4,750</u>	<u>4,666,000</u>	<u>9,780,000</u>	<u>17,085,000</u>	<u>41.7%</u>	<u>43.0%</u>	<u>41.1%</u>

